NOAA's National Weather Service Alaska Region

Serving the Nation's Environmental Forecasting Needs

NTSB PIREP Forum

Jeff Osiensky, NWS Alaska Region

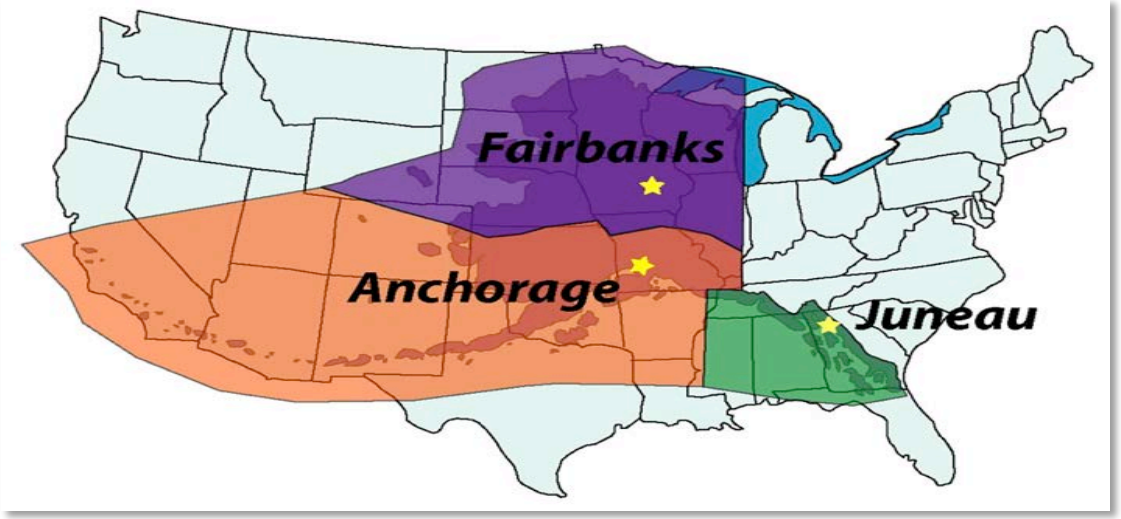
June 21, 2016

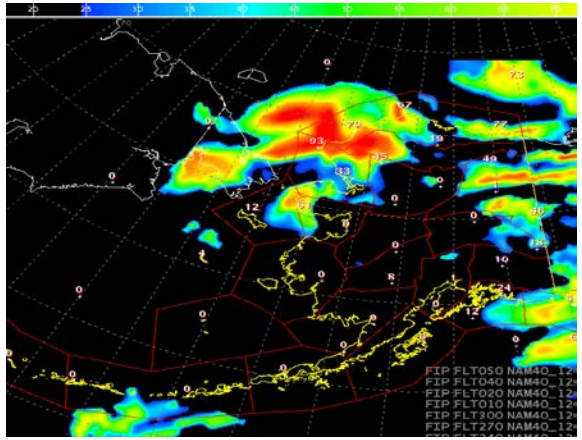
1st Panel

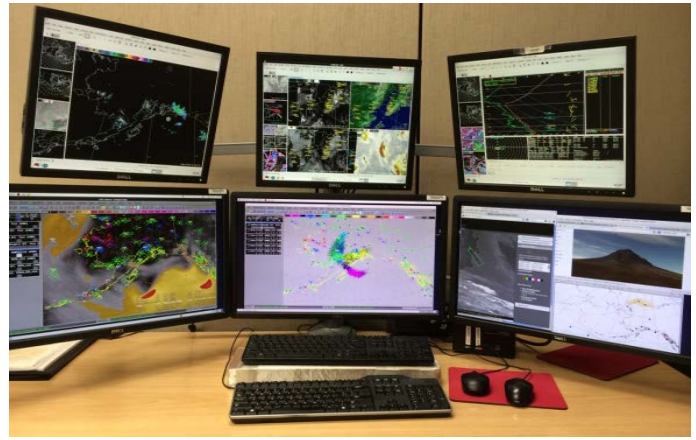
- Importance and Impact of PIREPs to Weather Services, Air Traffic Control and Pilots

Challenges in Alaska

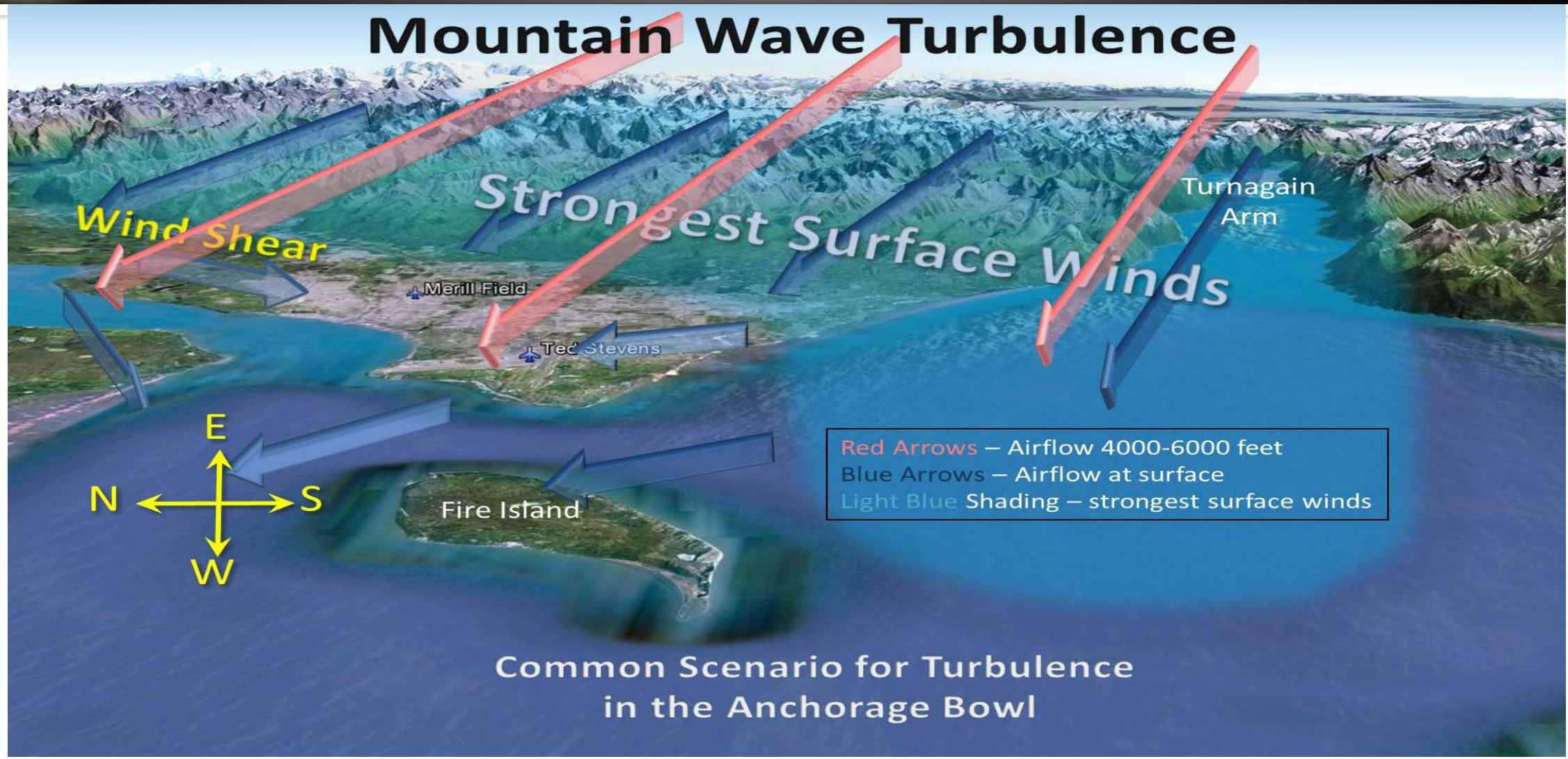
- Geography
  - Large areas
  - Complex terrain/land-sea
- Sparsity of observations
- Poor model performance
  - More observations (including PIREPs) help tremendously!







Turbulence with diminishing low level wind shear in Anchorage



PIREPs

Dispatcher PIREP Entry Form FAQ

NOTICE: The location lookup tool has been updated to accept 5 character intersction/fix locations. The locations will be verified on the server and the SA and OV computed based on the location. Also, the system will attempt to lookup unknown VORs entered in the OV field as airports and update the entry if a valid airport is found. Please let us know if you feel locations are missing.

SA	Nearest weather station
1.	UA UUA
2. /OV	Location
3. /TM	Time (UTC) Current Time
4. /FL	Altitude
5. /TP	

Items 1 through 5 are mandatory for all PIREPs

Location Lookup

Intersection/Fix:

OR

	DD	MM	N/S
Lat:			N
	DDD	MM	E/W
Lon:			W

VOR: Insert

ARPT: Insert

6. /SK	Sky Cover
7. /WX	Weather
8. /TA	Temperature
9. /WV	Wind
10. /TB	Turbulence
11. /IC	Icing
12. /RM	Remarks

Encode Reset

ENA UA /OV SNP281242/TM 1339/FL320/TP B747/TB MOD@FI320/RM ZAN=

SIT UA/OV BKA 330022/TM 1454/FL030/TP ASTR/SK OVC030/RM HESOK=

PIREP FORM

Pilot Weather Report = Space Symbol

3-Letter SA Identifier

1. UA → ____ Routine Report UUA → ____ Urgent Report

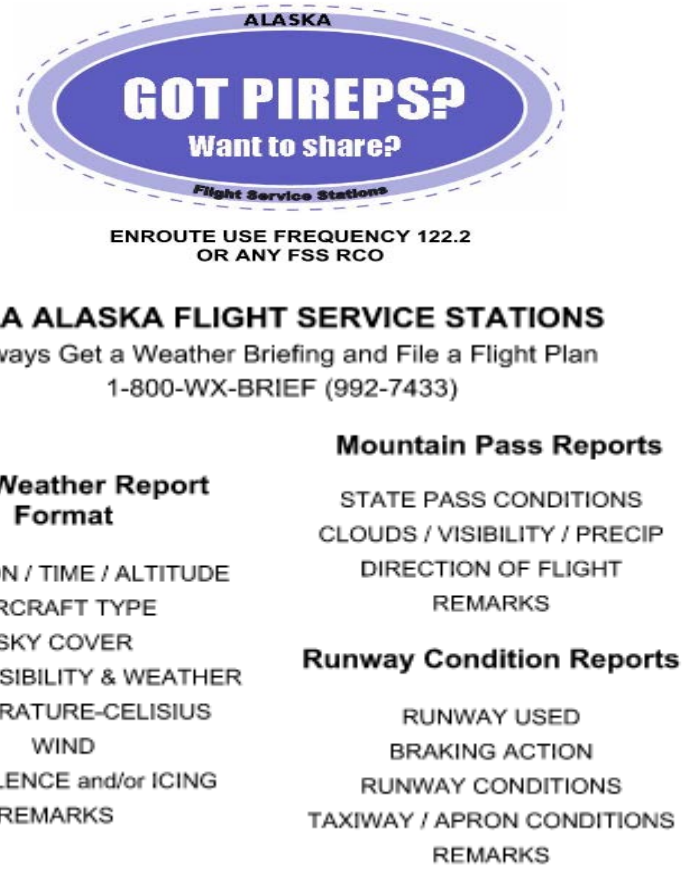
2. /OV →	Location:
3. /TM →	Time:
4. /FL	Altitude/Flight Level:
5. /TP →	Aircraft Type:
Items 1 through 5 are mandatory for all PIREPs	
6. /SK →	Sky Cover:
7. /WX →	Flight Visibility and Weather:
8. /TA →	Temperature *(Celsius)*:
9. /WV →	Wind:
10. /TB →	Turbulence:
11. /IC →	Icing:
12. /RM →	Remarks:

FAA FORM 7110-2 [illegible] previous edition [illegible]

We Want Your PIREPs!!!

- Highlighted in NTSB's report to the NWS and FAA
  - Need for more and better quality PIREPs
- Why?
  - Helps NWS to validate and adjust forecasts
  - Helps researchers to tweak algorithms (e.g. icing, turbulence)
  - Gives other pilots a "ride report"
  - More PIREPs = Better forecasts
  - Case studies and forecaster improvement

- Working closely with NTSB, FAA on this issue
- Win/Win for everyone!

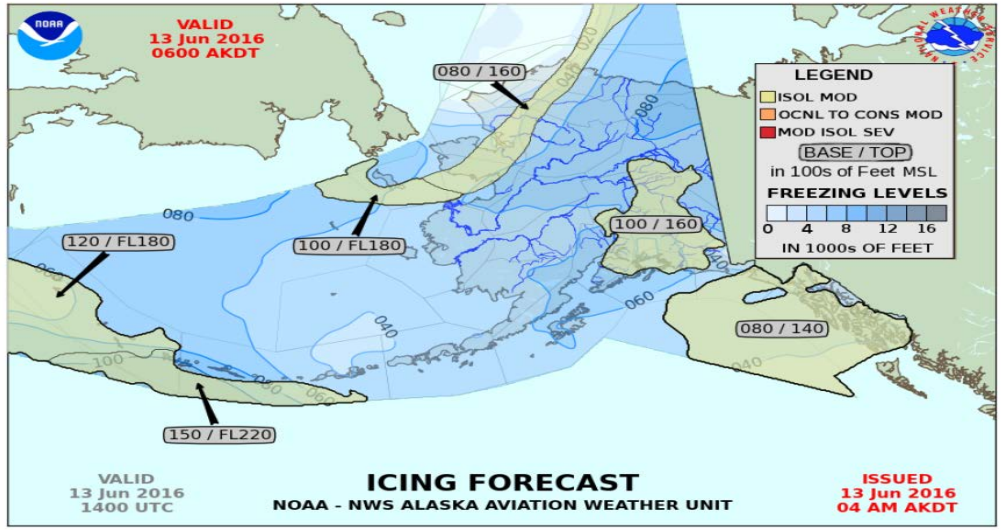


Courtesy: FAA Alaskan Region

Many Uses of PIREPs

Modeling

Pilot SA



Forecasting

Research

ATC Solicitation of PIREPs

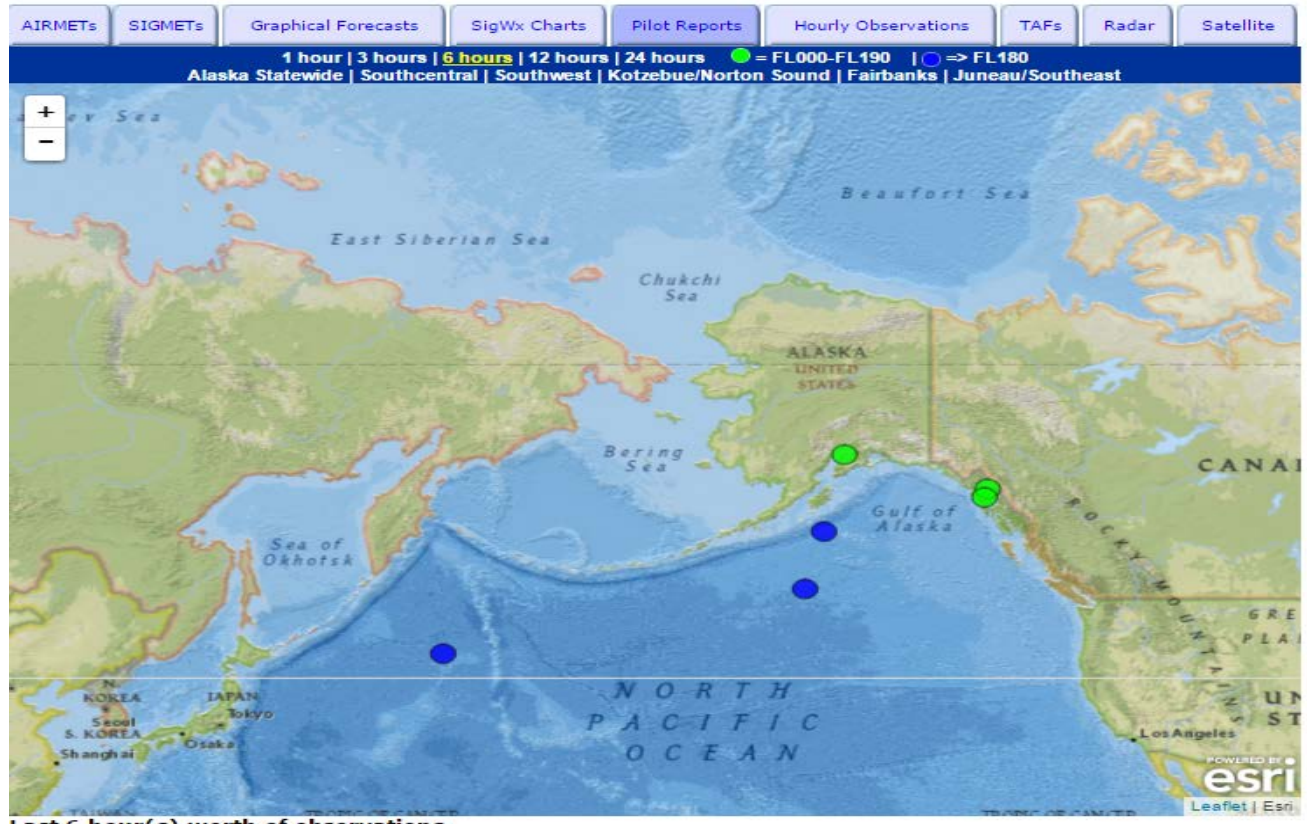
- Ceilings at or below 5000 feet
- Visibilities at or below 5 miles
- Thunderstorms
- Turbulence (Moderate or greater)
- Icing (Light or greater)
- Wind Shear
- Volcanic Ash Clouds

AAWU PIREP page

aawu.arh.noaa.gov

Select “Pilot Reports” tab

- 1, 3, 6, 12, 24 hours
- Green dot – SFC to 180
- Blue square - >/= 180
- Click on “dot” to get PIREP or reference list below



Last 6 hour(s) worth of observations.

- SIT UA /OV SIT355040 /TM 1448 /FL008 /TP C185 /SK OVC001-TOP008 /WX FV99SM /RM PERIL STRAIT/ CHATHAM STRAIT OPEN TO KUIU
- JNU UA /OV JNU /TM 1405 /FL125 /TP AT72 /SK SKC /WX FV99SM /TA M10 /TB NEG /RM TEMP AT 125 M10
- ENA UA /OV ANC-ENA /TM 1325 /FL025 /TP DHC6 /SK OVC030 /TA 09 /WV 22004KT /TB NEG
- ARP ASA871 55N 153W 1142 F350 MS54 260/115KT
- ARP ASA871 50N 155W 1104 F350 MS52 250/075KT
- ARP OAE272 4331N 16436E 0943 F330 MS47 265/055KT

Outreach

FAA Alaskan Region PIREP team

- Support FAAs GotWx campaign
  - Visual PIREPs

Alaska Aviation Coordination Council

- FAA, AOPA, Alaska Aviation Safety Foundation, Alaska Air Carriers Association, Alaska Airmen's Association, Alaska Department of Transportation and Public Facilities, Experimental Aircraft Association, Seaplane Pilots Association, USAF, US Army, University of Alaska (Anchorage – Aviation Program, Fairbanks – Aviation Technology Program), National Weather Service Alaska Region

NTSB PIREP Forum

Additional Questions or Comments?

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Meteorologist

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907-271-5132

Regional Aviation
NWS Alaska Region

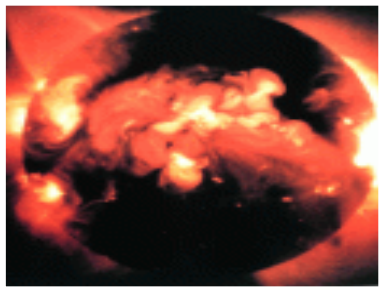
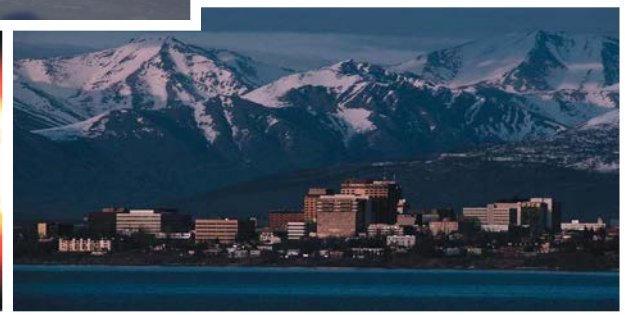
Background Slides

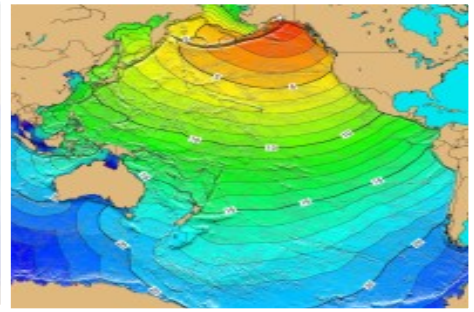
Service Areas

- **Aviation**
- Climate
- Fire Weather
- Marine Weather and Sea Ice
- Public Forecasts and Warnings
- Rivers/Hydrology
- Space Weather
- Tsunami
- Volcanic Ash







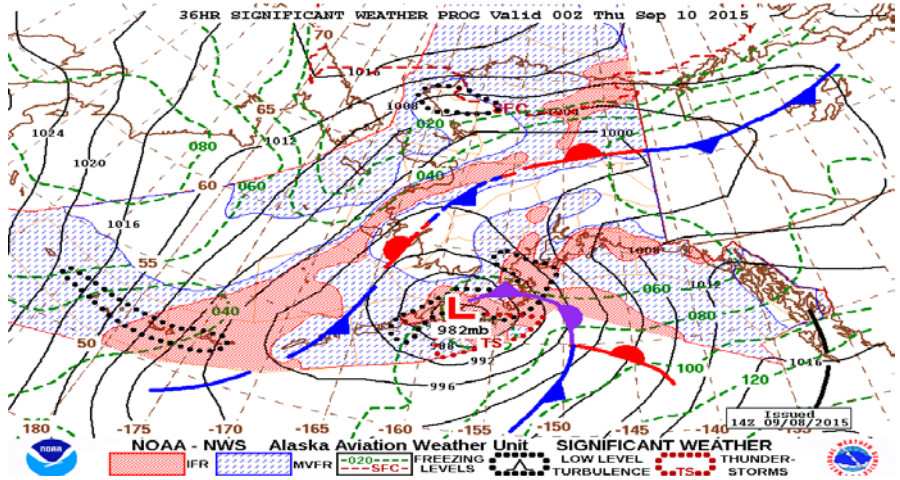

NWS Alaska Aviation Forecast Information

- Forecasts for AK's 5.76 million sq. kilometer airspace with involvement from 5 offices (3 WFOs, CWSU, and AAWU)
  - Graphics, Area Forecasts, AIRMETs, and SIGMETs

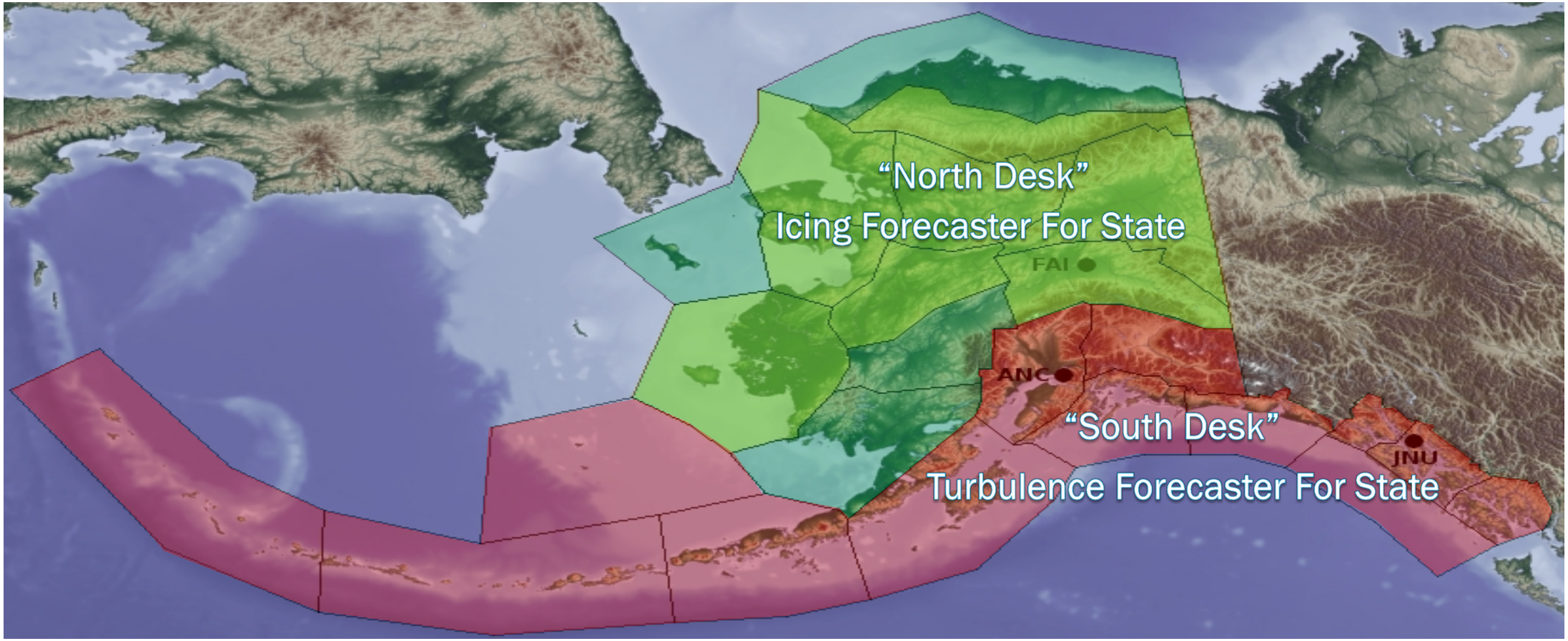
- Terminal forecasts for 37 airports (WFOs)
  - Issued every 6 hours with routine updates for ANC at 7am & 21UTC (12pm AKST and 1pm AKDT)

- Need for a strong internal collaborative forecast process

- Close partnerships with FAA, industry, and aviation associations to help guide services



AAWU Operations Structure



AIRMETs & SIGMETs (advisory & warning)

AIRMET (*3000 sq miles or greater) or occasional or prevailing conditions

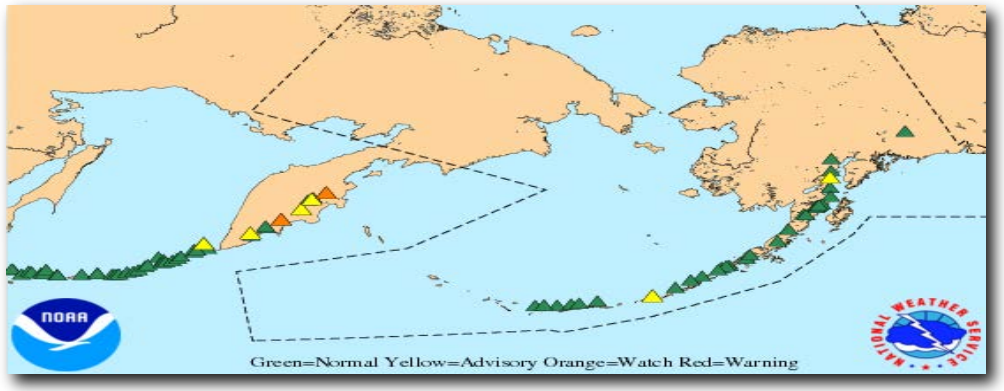
- Instrument flight Rule conditions (IFR)
- Mountain Obscuration
- Moderate Icing
  - May describe isolated severe
- Moderate Turbulence
  - May describe isolated severe
- Low Level Wind Shear (LLWS)
  - Shear below 2000 ft exceeding 10 kts/100 feet
- Strong Surface Winds
  - Sustained 30kts or greater

SIGMET (*3000 sq miles or greater) for occasional or prevailing conditions

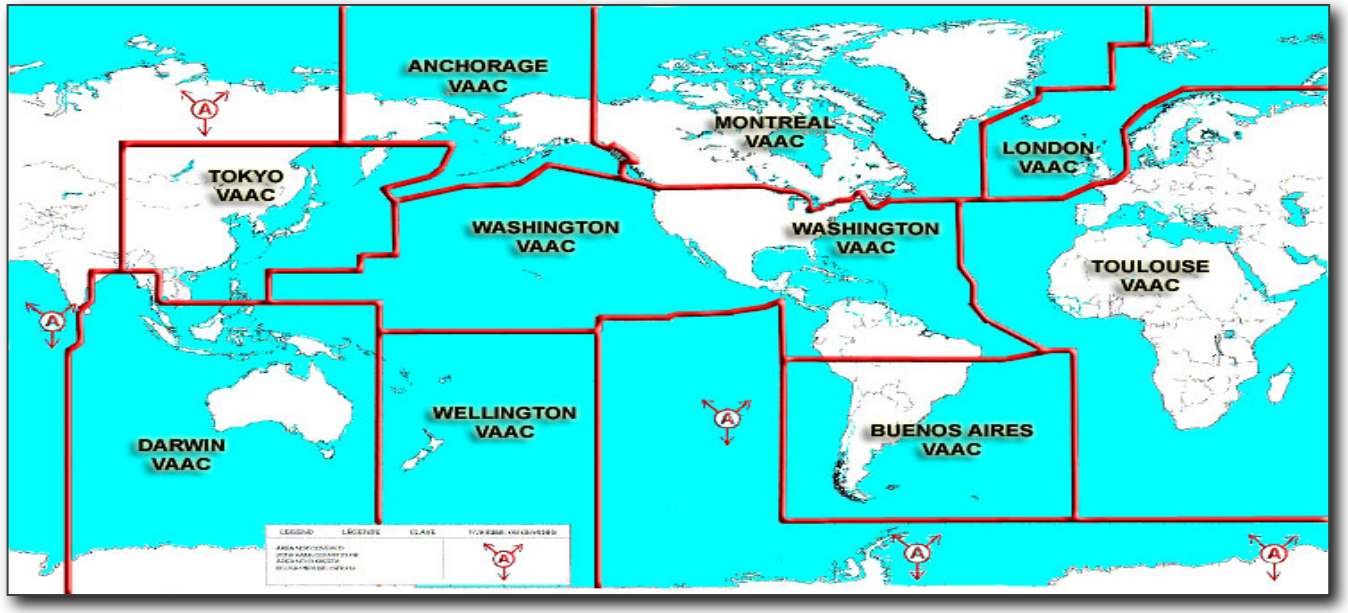
- Severe Icing
- Severe Turbulence
- Convective
  - Scattered coverage of storms
  - Storms obscured by stratus
  - Isolated severe storms (1” hail and/or winds > 58 mph)
- Volcanic Ash

* Or in high traffic areas under 3000 sq miles with significant impacts expected

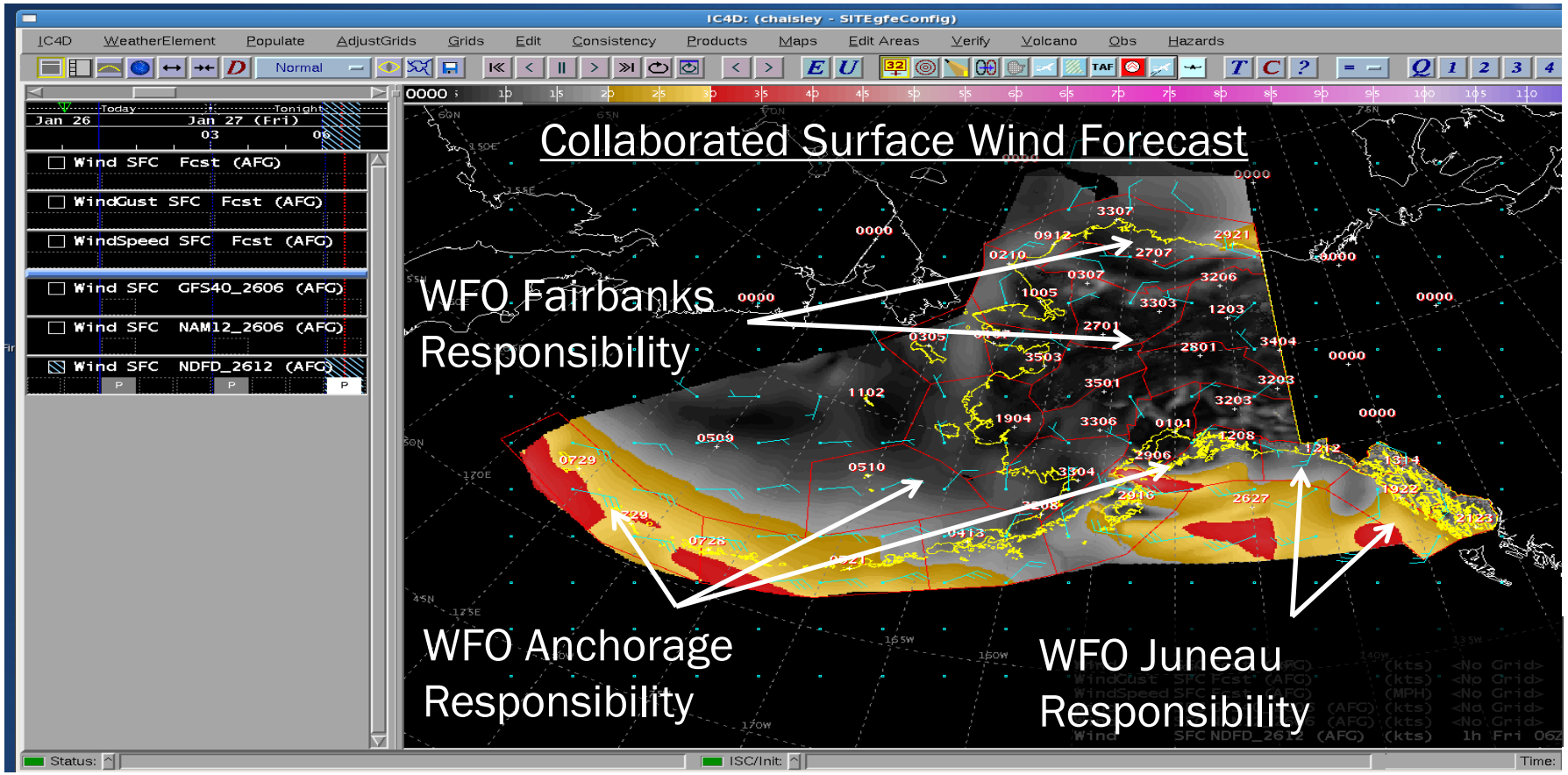
Aviation Weather Services
Volcanic Ash Advisory Center



- Detect and track volcanic ash for >50 active volcanoes in Alaska
- Develop interagency plans for responding to volcanic ash fall and related hazards
- Leading role in international coordination, planning, and policy issues



Internal NWS Collaboration

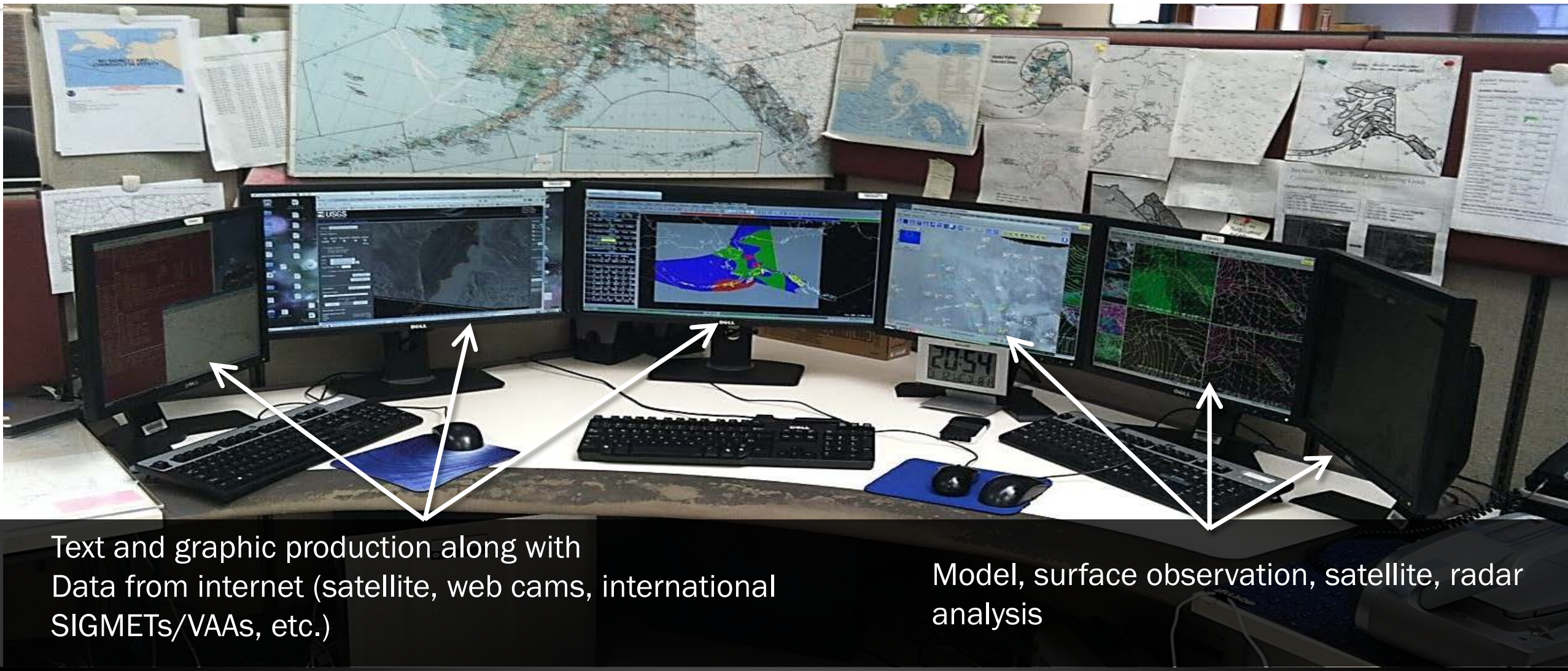


Forecast offices generate a database of weather parameters

Software is used to collaborate weather database across all NWS forecast offices

Forecast graphics and text can be derived from the database

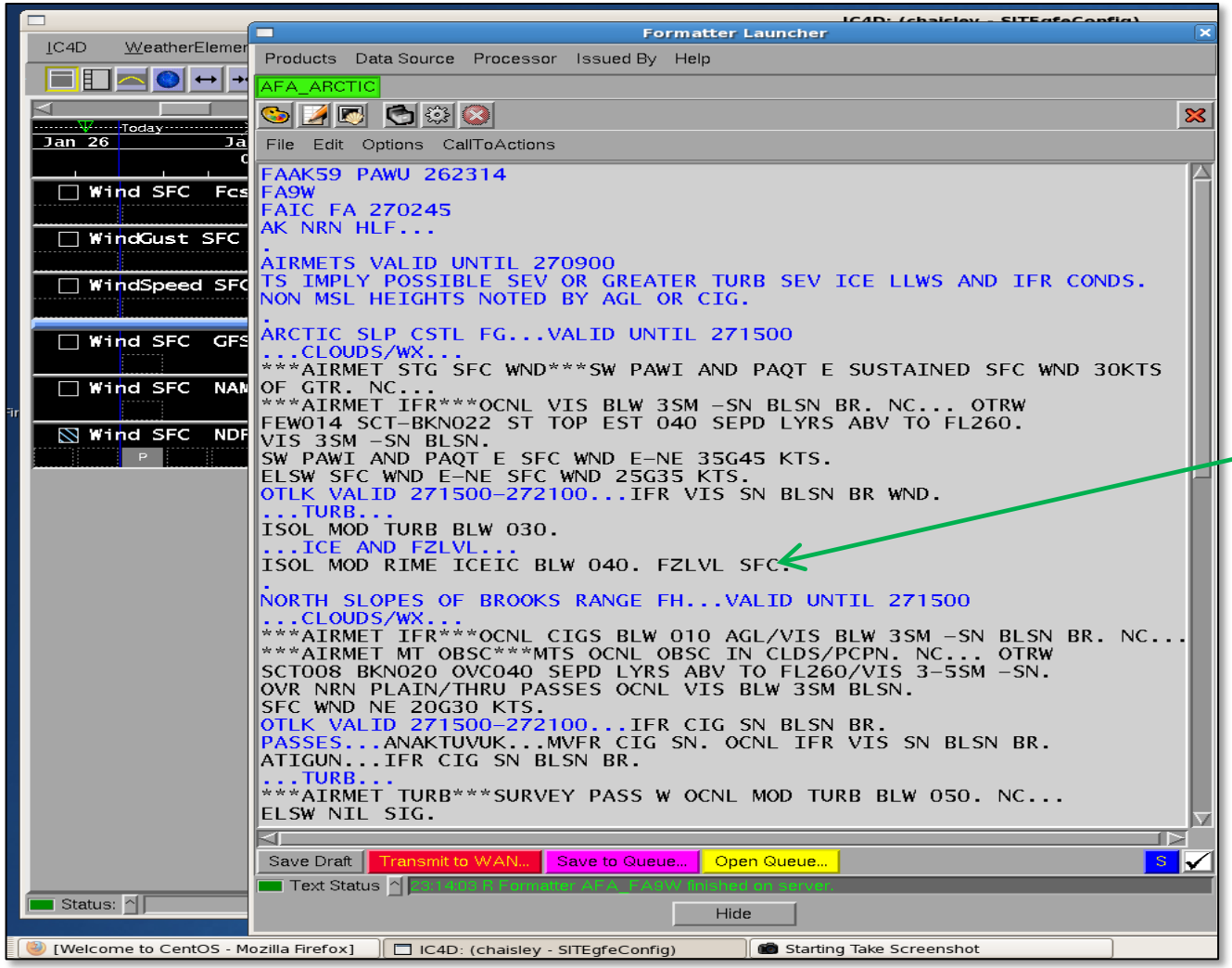
Data availability and Use in AAWU/Anchorage VAAC

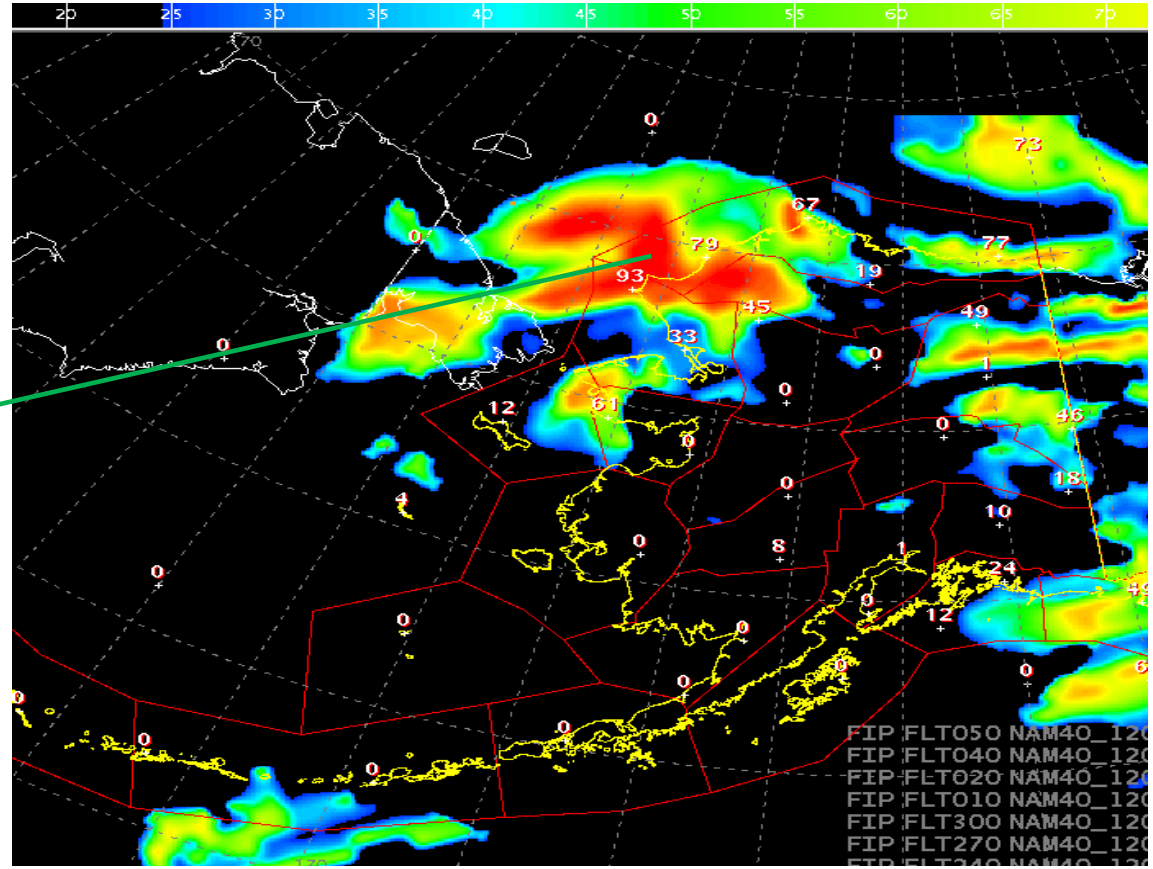


Text and graphic production along with
Data from internet (satellite, web cams, international SIGMETs/VAAs, etc.)

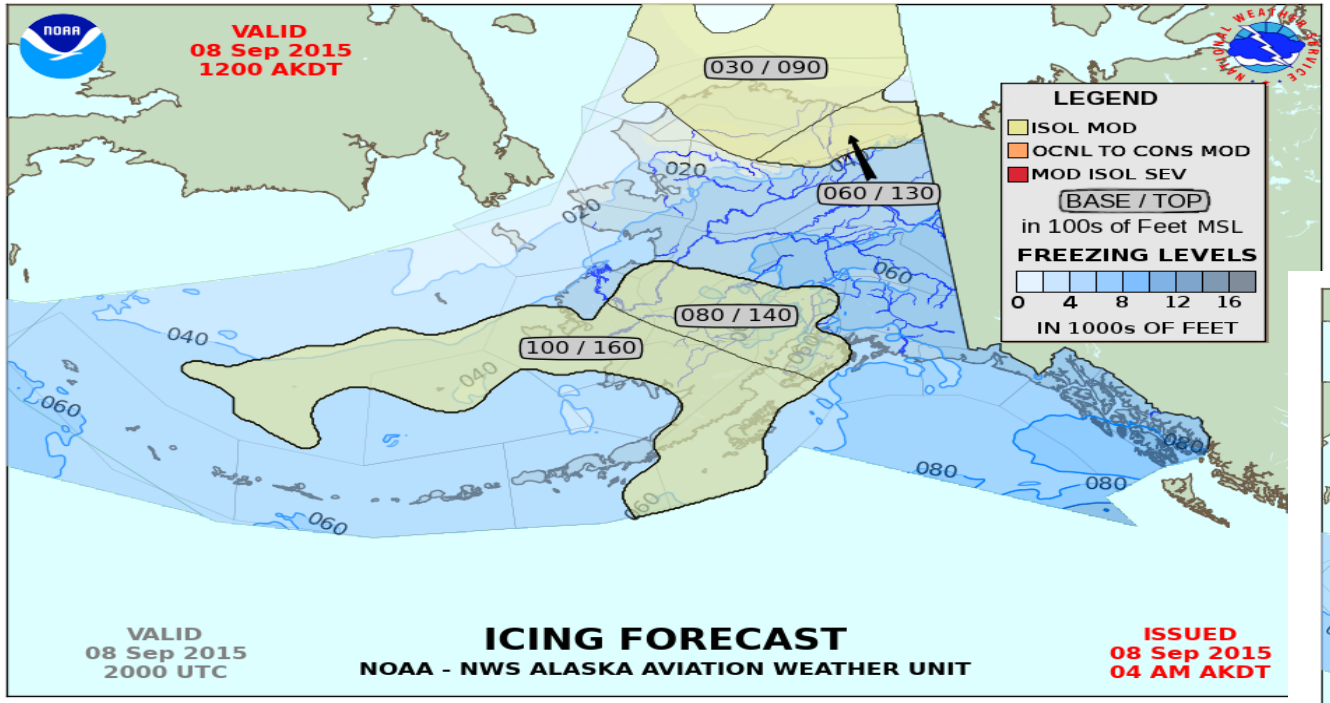
Model, surface observation, satellite, radar analysis

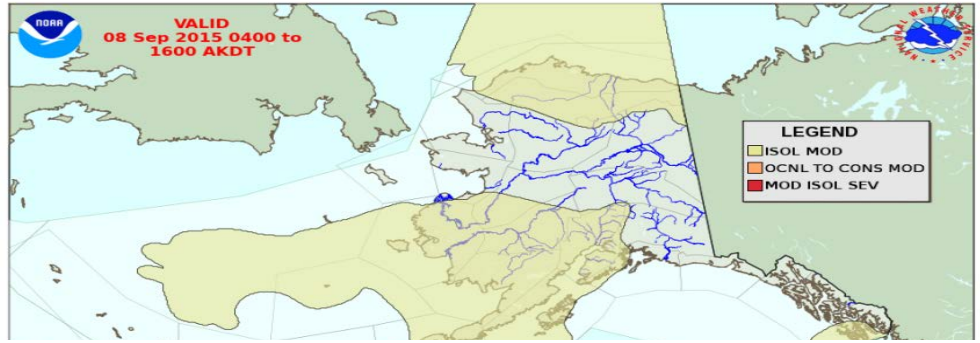
Area Forecasts, more DIRECTLY based on computer simulations and observations

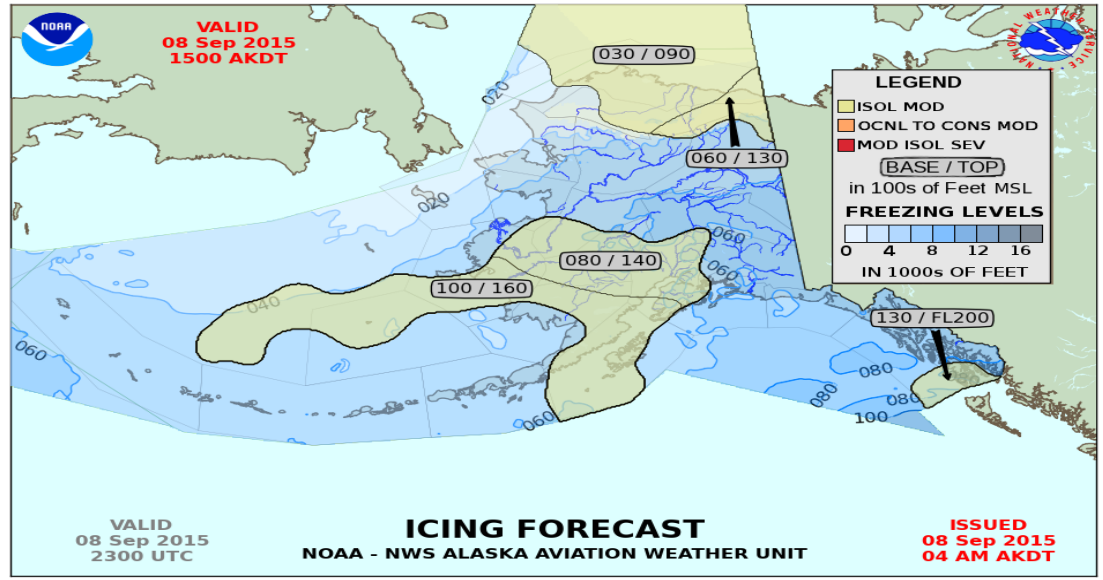




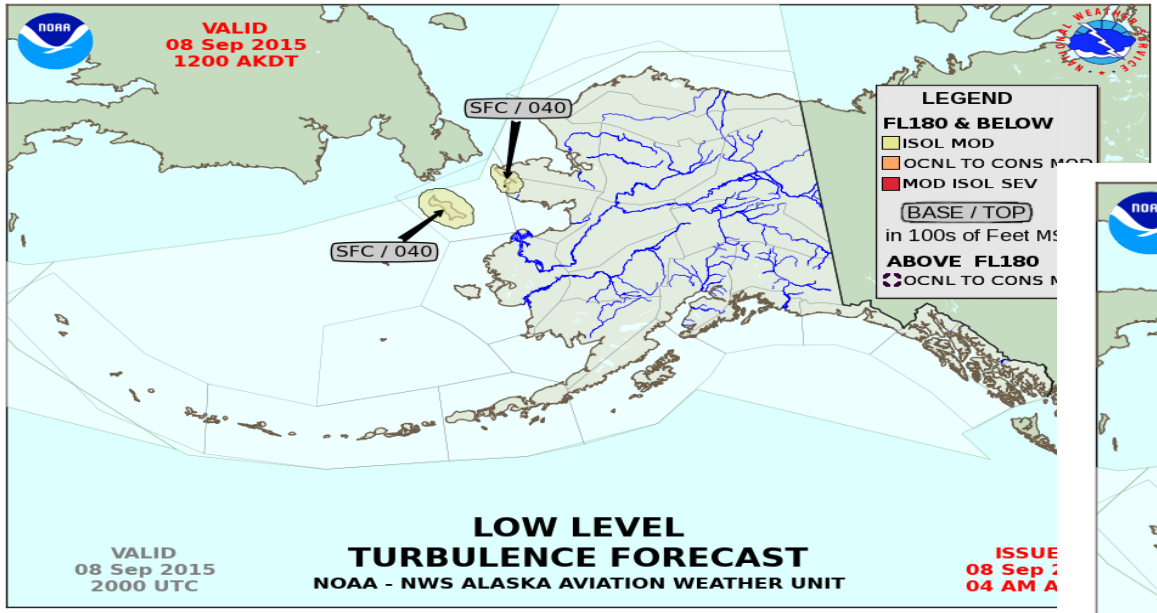
Graphical Icing Forecasts at 3 hourly intervals & 12 hour Summary

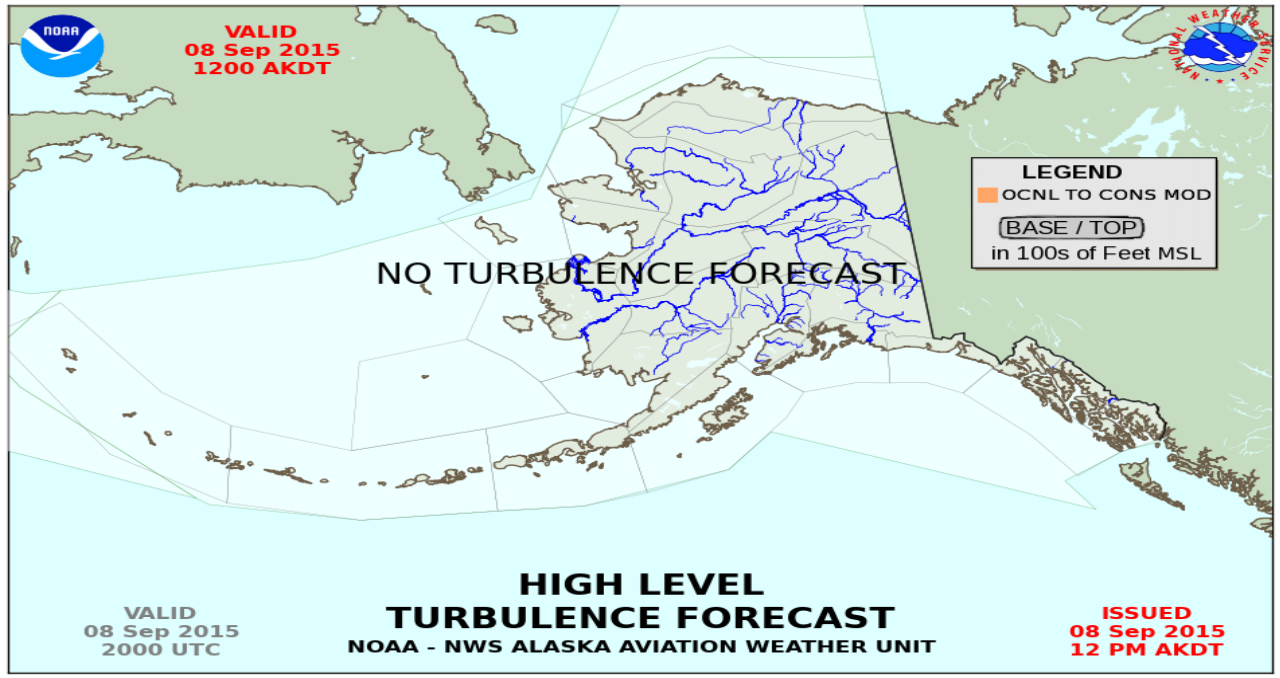




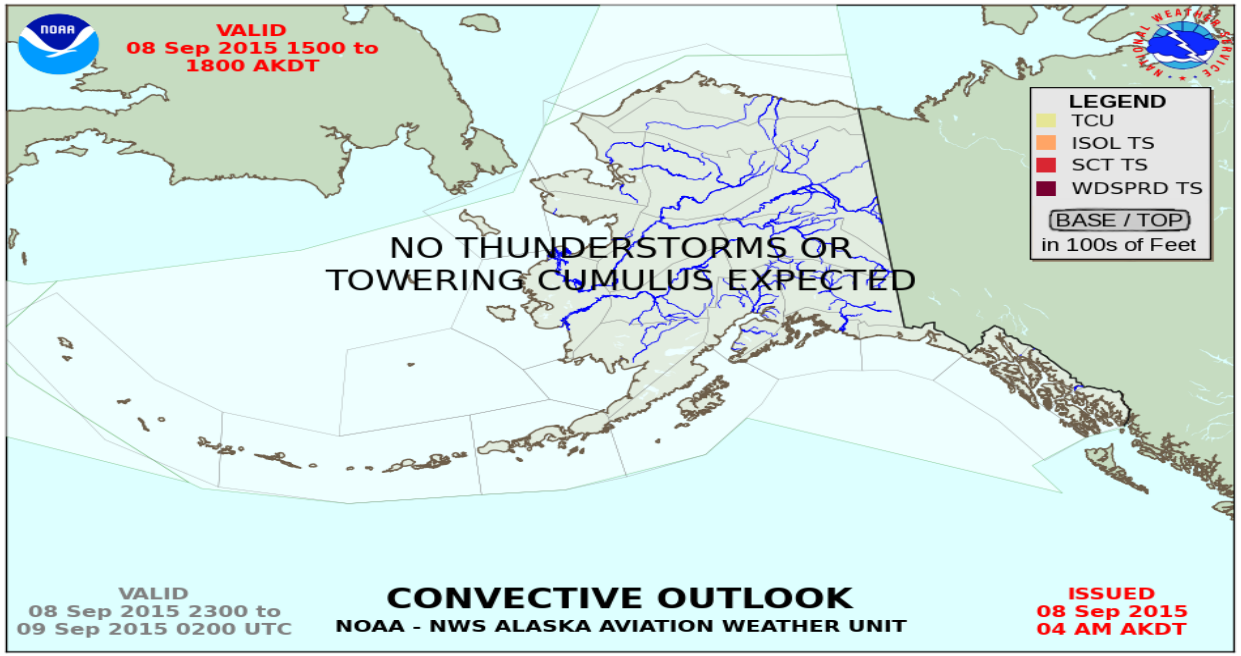


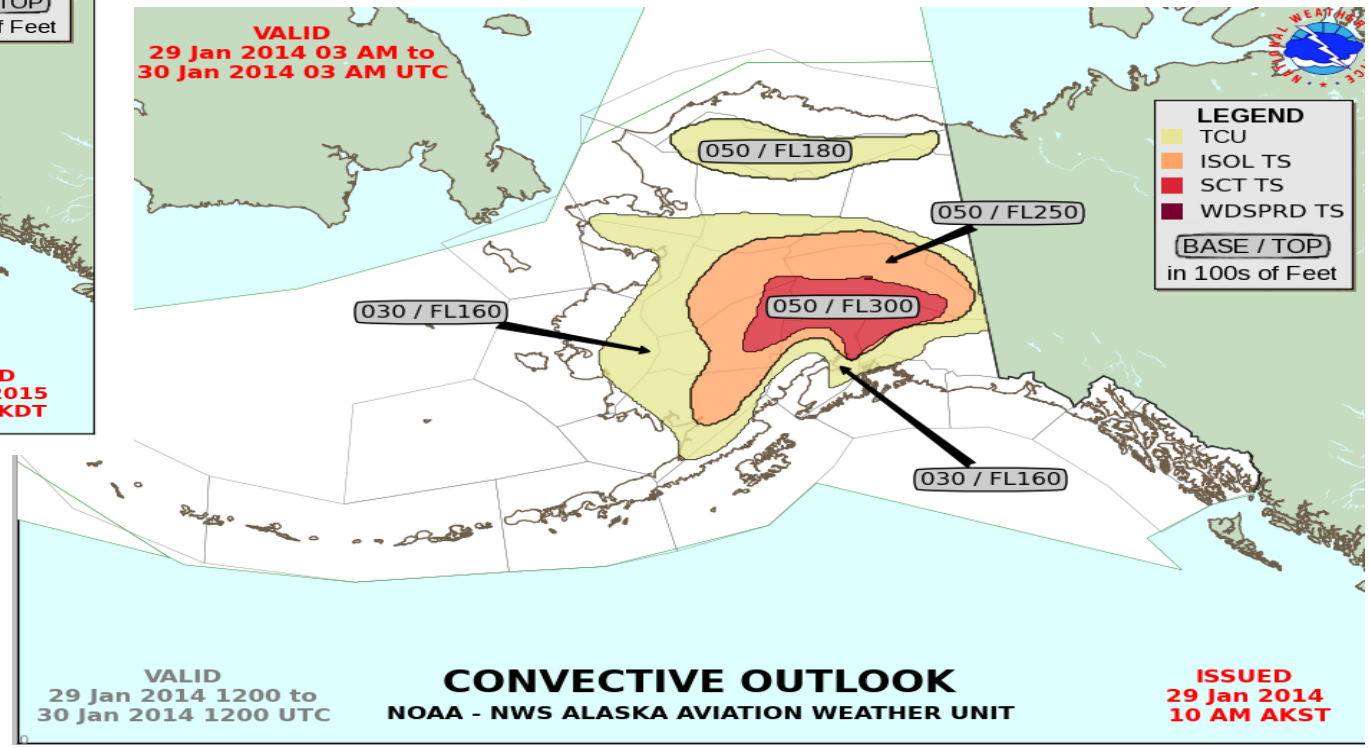
Graphical Turbulence Forecasts at 3 hourly intervals & 12 hour summary





Convective Forecasts up to 3 hourly intervals & 24 hour summary





Alaska Pilot's Guide

AIRMETs (WA)

Airmen's Meteorological Information (AIRMETs) are included in the FAs for the following occasional or greater conditions when they are occurring or are expected to occur within the first eight hours of the FA's valid period over an area of at least 3,000 square miles:

- Moderate icing.
- Moderate turbulence.
- Sustained surface wind of 30 knots or more.
- Ceilings less than 1,000 feet and/or visibility less than three miles affecting over 50% of a 3,000 square mile area at any one time.
- Extensive mountain obscuration.

SIGMETs (WS)

A SIGMET is a concise description of the occurrence or expected occurrence of specified en-route weather phenomena which is expected to affect the safety of aircraft operations. The AAWU will issue a SIGMET when any of the following conditions are affecting or, in the judgment of the forecaster, are expected to affect an area of at least 3,000 square miles or an area judged to have a significant impact on the safety of aircraft operations:

- Tornadoes.
- Lines of thunderstorms.
- Thunderstorms when embedded in other phenomena such as rain or restricted visibilities.
- Hail of 3/4" or greater diameter.
- Severe or extreme turbulence.
- Severe icing.
- Volcanic eruption.
- Volcanic ash, dust storms, sandstorms.

SIGMETs are valid for up to four hours from the time of issuance.

Terminal Aerodrome Forecasts (TAFs)

A TAF is a description of the aviation weather conditions expected to occur at an airport or within a 5 nautical mile radius. Anchorage, Fairbanks, and Juneau Forecast Offices produce TAFs. TAFs are issued only when routine aviation surface observations are available. At stations where the routine aviation surface observations are available, TAFs are issued four times daily for a 24-hour period. TAFs are amended whenever significant changes in the weather at the terminal occur unless otherwise noted on the TAF.

How You Can Help

Pilot Reports (PIREPs) are an important data source for the meteorologists forecasting for your flight. PIREPs should be relayed to the Flight Service Station or the Anchorage Air Route Traffic Control Center whenever possible. Since weather observations are so sparse in Alaska, your PIREP will fill a gap in the data. Please submit them as often as possible!

Aviation Weather Services in Alaska

United States Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
Alaska Aviation Weather Unit

The National Weather Service prepares four major products for domestic and international aviation users in Alaska: Area Forecasts (FA), Aviation In-Flight Advisories (AIRMET, SIGMET, & CWA), Aviation Terminal Forecasts (TAF), and Winds & Temperatures Aloft (FD). All products can be found by going directly to the Alaska Aviation Weather Unit (AAWU) homepage.

Alaska Aviation Weather Unit
Meteorologist-in-Charge
6930 Sand Lake Road
Anchorage, Alaska 99513
(907)266-5116

North Desk: (907)266-5109
South Desk: (907)266-5110

http://aawu.arh.noaa.gov/

Area Forecasts (FA)

The FA is a 12-hour forecast of expected large-scale weather conditions. FAs include a synopsis, AIRMETs, clouds and weather forecasts, designated pass forecasts, and icing & turbulence forecasts. The FA also includes an outlook for the six hours following the valid time of the forecast for a total of 18 hours of weather information. Since the FA primarily deals with widespread significant weather features, it may not include localized situations which affect aircraft operations. This is particularly true in areas where weather observations are sparse. The FA serves as a flight planning and pilot briefing aid for general aviation, civil and military operations, and FAA briefers.

In Alaska, FAs are issued at **4:15am**, **12:15pm**, and **8:15pm** and are amended at other times if weather conditions change significantly from what is included in the forecasts. The figure below shows a map of the 25 zones for which FAs are issued.

The following conditional terms will be used in FAs to indicate areal coverage of clouds and visibility obstructions:

- **ISOL** (isolated): Conditions expected over an area less that 3,000 square miles or for less that 50% of the forecast period.
- **OCNL** (occasional): Conditions expected over an area of 3,000 square miles or greater or for more that 50% of the forecast period.

The following terms will be used to indicate areal coverage for showers and thunderstorms:

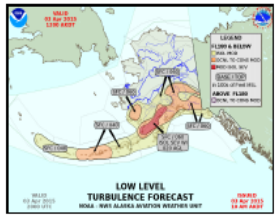
- **ISOL** (isolated): Less than 25% of the area is affected.
- **SCT** (scattered): 25% to 50% of the area is affected.
- **WDSPRD** (widespread): More than 50% of the area is affected.

Graphical Area Forecasts

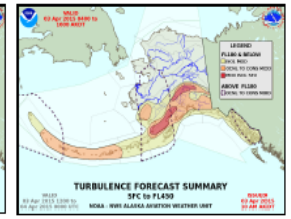
Graphical area forecasts are issued three times per day and depict the conditions described in the text FA. Four icing graphics, four low-level turbulence graphics, and four high-level turbulence graphics - each depicting forecasted conditions for a three hour period - are issued at **4:30am**, **12:30pm**, and **8:30pm**. Additionally, 12-hour summary graphics that combine the 3-hour icing and turbulence forecasts are issued at those times.

Two flying weather graphics, each valid for six hours, are also issued at **4:30am**, **12:30pm**, and **8:30pm**. Flying weather graphics depict forecasted areas of prevailing MVFR and IFR conditions and areas where surface winds are forecasted to be 30 knots or greater. Surface charts are issued at **12:45am**, **6:30am**, **12:45pm**, and **5:15pm** and convective outlook graphics are issued at **4:30am** May 1st through September 30th.

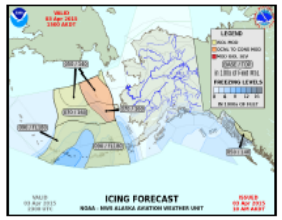
Graphical area forecasts are updated when weather conditions change significantly from what is in the forecast. Below are samples of graphical area forecasts.



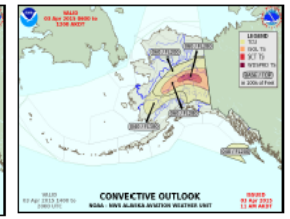
Three Hour Low-level Turbulence Forecast



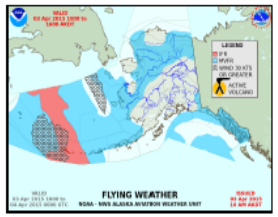
Twelve Hour Turbulence Summary



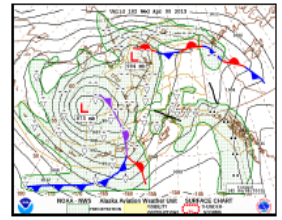
Icing Forecast
Depicts freezing-levels and forecasted areas of ISOL and OCNL icing.



Convective Outlook
Depicts convective showers and thunderstorms. Issued May through September.



Flying Weather
Depicts MVFR and IFR conditions and surface winds greater than 30 knots.



Surface Chart
Depicts large-scale weather systems, fronts, and areas of precipitation.

Digital Aviation Services Summary

- Provides more detail temporally and spatially
- Ceiling and visibility improvements
  - Step towards gridded TAFs
- Continue to work with FAA Aviation Weather Research Program (AWRP), NOAA Global Systems Division, and others to improve algorithms and develop forecaster interface tools
- Spin up of NWS Alaska Region Arctic Test Bed
  - Help to facilitate quicker R20 process
- AAWU product description http://aawu.arh.noaa.gov/AAWUProductDescriptions.pdf